Abstract of the Invention

An adaptive control system (ACS) uses direct output feedback to control a plant. The ACS uses direct adaptive output feedback control developed for highly uncertain nonlinear systems, that does not rely on state estimation. The approach is also applicable to systems of unknown, but bounded dimension, whose output has known, but otherwise arbitrary relative degree. This includes systems with both parameter uncertainty and unmodeled dynamics. The result is achieved by extending the universal function approximation property of linearly parameterized neural networks to model unknown system dynamics from input/output data. The network weight adaptation rule is derived from Lyapunov stability analysis, and guarantees that the adapted weight errors and the tracking error are bounded.